

BROWNWATER LEVEE FOREST (LOW LEVEE SUBTYPE)

Concept: Brownwater Levee Forests are forest communities of natural levee deposits along brownwater Coastal Plain rivers, with a significant component of the suite of levee tree species. The Low Levee Subtype covers levees on the lower reaches of rivers or on lower parts of upstream levees, where more water-tolerant species such as *Quercus lyrata* and *Carya aquatica* are major components, but where characteristic levee species such as *Fraxinus pennsylvanica* and *Ulmus americana* are still significant. In contrast to other subtypes, the Low Levee Subtype often has little understory or shrub layer and may have a dense herb layers dominated by *Carex* spp. Also included here are communities of relict natural levees in the tidally influenced lower reaches of brownwater rivers, which have similar vegetation.

Distinguishing Features: Brownwater Levee Forest communities are distinguished by their occurrence along brownwater rivers and the presence of at least some of the suite of levee tree species such as *Fraxinus pennsylvanica*, *Ulmus americana*, and *Platanus occidentalis*. The Low Levee Subtype is distinguished from other subtypes by the dominance of more water-tolerant tree species, particularly *Quercus laurifolia*, *Quercus lyrata*, *Carya aquatica*, *Nyssa aquatica*, and *Taxodium distichum*, in combination with characteristic levee species such as *Fraxinus pennsylvanica*, *Ulmus americana*, *Platanus occidentalis*, and *Betula nigra*. While *Taxodium distichum* and *Nyssa aquatica* are generally present, they do not strongly dominate as they do in the Cypress–Gum Swamp type. These communities also may look similar to Brownwater Bottomland Hardwoods (Swamp Transition Subtype), which can have a substantial amount of *Fraxinus pennsylvanica*, but which occurs farther from the river and lacks *Platanus occidentalis* and *Betula nigra*.

Synonyms: *Fraxinus pennsylvanica* - *Quercus laurifolia* - *Quercus lyrata* - *Carya aquatica* Forest (CEGL004695).

Ecological Systems: Atlantic Coastal Plain Small Brownwater River Floodplain Forest (CES203.250). Southern Atlantic Coastal Plain Large River Floodplain Forest (CES203.066).

Sites: The Low Levee Subtype occurs along channels and on point bar deposits of brownwater rivers. It may occasionally occur on recently abandoned channel segments farther from the active river. The Low Levee Subtype most often borders rivers in the outer Coastal Plain, including tidally influenced stretches, but it may also occur in the inner or middle Coastal Plain where broad levees slope away from the river. It may occasionally occur on backwater streams, blackwater streams that join brownwater rivers and have sediment-laden flood waters pushed up into them from downstream.

Soils: Soils are coarse-textured or medium-textured alluvial soils, with little horizon development because of relatively recent deposition. Examples are mapped as Chewacla (Fluvaquentic Dystrudept), Congaree (Oxaquic Udifluent), Chastain or Wehadkee (Fluvaquentic Endoaquepts), or Muckalee (Typic Fluvaquent). Some examples are small enough to not be distinguished in mapping.

Hydrology: The Low Levee Subtype is intermittently or occasionally flooded, probably usually for short periods. Though wetter than the Medium Levee Subtype because of finer texture soils,

lower elevation, and higher water table, the lower river reaches where most examples occur have less flood amplitude. It is unclear if the low levees stay flooded longer than those upstream, or even as long. Those along tidal reaches do not usually flood in normal high tides. Examples on lower reaches of rivers are also particularly susceptible to flooding by storm surges and by the gradual effects of rising sea level. In contrast, examples on upstream reaches do stay flooded longer than higher levee communities, and dam control may keep them flooded even longer.

Vegetation: Brownwater Levee Forests are naturally closed forests punctuated by canopy gaps. In the Medium Levee Subtype, the canopy is a varying mix that includes some *Taxodium distichum*, *Quercus lyrata*, *Quercus laurifolia*, and *Carya aquatica*, along with more water tolerant of the characteristic natural levee species such as *Fraxinus pennsylvanica* and *Ulmus americana*. Other characteristic species, such as *Acer negundo* and *Celtis laevigata*, may be present but are not abundant. The understory consists primarily of *Carpinus caroliniana* but may include *Crataegus viridis* and other species. The shrub layer is generally not dense. *Ilex decidua* usually dominates, though *Arundinaria tecta* may dominate patches. Vines may be prominent, with *Smilax rotundifolia*, *Campsis radicans*, *Toxicodendron radicans*, *Smilax hispida*, *Smilax bona-nox*, *Thyrsanthella difforme*, *Muscadinia rotundifolia*, and *Berchemia scandens* all occurring with high to moderate frequency in CVS and other plot data (Rice and Peet 1997; Rice et al 2001; Faestel 2012). Herbs range from sparse to dense. Frequent species in plots include *Saururus cernuus*, *Boehmeria cylindrica*, *Viola sororia*, *Symphyotrichum lanceolatum*, *Carex louisianica*, *Carex tribuloides*, *Leersia virginica*, *Carex corrugate*, *Carex abscondita*, *Leersia oryzoides*, and *Mitchella repens*. Species abundant in higher levees, such as *Chasmanthium latifolium* and *Elymus virginicus*, may be present but generally with low cover. Other species, such as *Onoclea sensibilis*, *Cinna arundinacea*, *Persicaria punctata*, *Persicaria hydropiperoides*, *Persicaria setacea*, *Pluchea camphorata*, *Impatiens capensis*, *Juncus effusus*, and other species of *Carex* are less frequent but indicate the wetness of this subtype compared to the Medium Levee Subtype. Exotic plants, especially *Lonicera japonica* but also *Alternanthera philoxeroides*, may be abundant. Though not presently widespread in North Carolina, *Triadica sebifera* may become more frequent in this community. The epiphyte *Tillandsia usneoides* may have high cover, and *Pleopeltis michauxiana* may cover trunks and branches of some trees.

Range and Abundance: Ranked G3G4. North Carolina's examples are scattered along the brownwater rivers. They are more widely scattered farther inland on lower slopes of large natural levees and on tidal reaches of brownwater rivers. The equivalent NVC association is attributed only to North Carolina and questionably to Virginia. However, similar communities must occur in South Carolina and Georgia. It seems unlikely that it should have a narrower range than the other brownwater levee associations. However, it is possible that the increasing tidal amplitude southward may affect the development of this subtype.

Associations and Patterns: The Low Subtype occurs as linear bands along the frontage of lower brownwater rivers or on the slopes of natural levees farther upstream. It may also border distributary channels or sloughs away from the main river channel. The bands are more often narrow and discontinuous than in the other subtypes. Patches are most often bordered by Cypress–Gum Swamp or Tidal Swamp.

Variation: No variants are recognized. This subtype is less diverse and consequently has a narrower range of variation. Differences among flowing brownwater riverbanks, upstream back levee slopes, and tidal examples should be sought.

Dynamics: Dynamics of the Low Levee Subtype are generally similar to the Medium Levee Subtype. However, flooding dynamics may be different.

Most examples of this subtype occur far downstream, where excessive sedimentation and altered flood regimes created by Piedmont dams have less effect. However, examples on the lower parts of upstream levees are affected by them. Because they lie at a low elevation relative to the river, dam-altered flows that increase the duration of low-level floods may have a particular impact on this community in upstream sites. Hochman (2004) outlined many of the consequences of increased duration of flooding including reduced ability of seedlings to grow before canopies leaf out in spring, slower seedling growth rates, and stress to older trees that established under different flooding conditions.

Comments: The Low Levee Subtype often has a distinctly different aspect than the other subtypes, especially where it does not border the river. Instead of the complex multi-layered structure of the higher levees, the vegetation may be a two-layered forest, with a canopy and sedge-dominated herb layer but little in the intermediate strata.

Rare species: Vascular plants: *Carex socialis*, *Leersia lenticularis*, *Oenothera riparia*, and *Stachys tenuifolia*.

Vertebrate animals: *Corynorhinus rafinesquii*, and *Myotis austroriparius*.

References:

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